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DOMESTIC MOSQUITOES



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DOMESTIC MOSQUITOES

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There are a number of different kinds of mosquitoes in most localities where these insects are troublesome. These have different habits, and the control procedure must be designed to fit the habits. Three



FIGURE 1.—The northern house mosquito. Adult female. About 14 times natural size. (After John B. Smith.)

species of mosquitoes are herein treated under the more or less arbitrary designation "domestic mosquitoes." This grouping is made because these mosquitoes breed in and about houses, are always associated with man, and have a restricted flight range. Thus by individual effort the householder can do much to control them. It

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should be borne in mind that other kinds of mosquitoes may breed near houses and may enter buildings and attack man, as in the case of malaria mosquitoes. Some of the control measures, such as screens and sprays, mentioned for use against domestic mosquitoes may be useful in protecting man from the attack of other species found in houses.

Among the other kinds of mosquitoes not treated herein, some breed in tree holes and pools and others in the edges of lakes, on irrigated meadows, in swamps, and in salt marshes. Although many of these will bite people viciously, they are not closely associated with man, and their control cannot be accomplished through individual effort but requires concerted community action.

Of the three domestic species the northern house mosquito (*Culex pipiens* L.) is widely distributed in the northern half of the country and in Canada, while the other two, the southern house mosquito (*C. quinquefasciatus* Say) and the yellow-fever mosquito (*Aedes aegypti* (L.)), are commonly met with in the South. The northern house mosquito (fig. 1) and the southern house mosquito resemble each other closely in appearance and habits. They are both pale brown, with whitish bands across the base of the abdominal segments, but otherwise without conspicuous bands or other markings. The yellow-fever mosquito (fig. 2) is very dark colored, with a silvery lyre-shaped mark on its back and with silvery bands across the abdomen and legs.

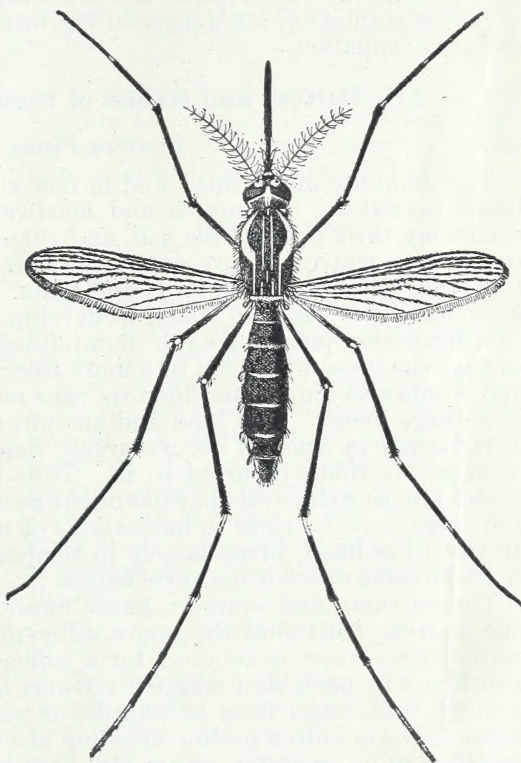


FIGURE 2.—The yellow-fever mosquito. Adult female. About 14 times natural size.

Seriousness of the Mosquito Problem

Domestic mosquitoes breed in great numbers in towns and cities; in fact, because of their severe annoyance to man, they often constitute the major mosquito problem in large cities. When abundant, they also cause considerable worry to poultry and livestock.

These mosquitoes can carry certain parasitic worms that attack man, and they may have some part in the transmission of heart

worms of dogs. The yellow-fever mosquito is the principal carrier of the dreaded disease of man from which it derives its name and also of dengue, or breakbone, fever. Fortunately, as long as yellow fever is kept out of the country by quarantine regulations there is no danger of contracting it from the bite of this mosquito. However, when the malady gets a start in a country where it is not native, the resulting sickness, death, and economic losses are terrible. With the presence of yellow fever in a number of South American and African countries and with the use of airplanes and other rapid methods of transportation now employed, the danger of the introduction and spread of the disease is apparent.

Life History and Habits of Domestic Mosquitoes

Breeding Places

The domestic mosquitoes, and in fact all other mosquitoes as well, breed in water. Salt-marsh and floodwater mosquitoes and a few others lay their eggs on the soil, and these hatch only after they are covered by water. Many are of the opinion that mosquitoes breed in weeds, tall grass, shrubbery, and vines. This is not the case; they must have free water in which to develop. Heavy vegetation serves as a harboring place for adult mosquitoes and may break the wind so that the mosquitoes can bite more freely in enclosed yards. Grass and weeds also hide water-filled tin cans and depressions in which the pests may breed. The kind and amount of the water and the place or container in which it occurs largely determine the particular kind of mosquito that will breed in it. Thus the yellow-fever mosquito breeds almost exclusively in what might be called man-made containers, and these must be close to habitations of man; rain-pool mosquitoes, on the other hand, breed largely in temporary pools formed by rains or by streams overflowing their banks.

The northern and southern house mosquitoes breed in water-filled rain barrels, tubs, and the many different places about houses and yards where water is retained for a sufficient length of time. They also breed in pools and sluggish streams heavily contaminated with manure, with water from barnyards, or with sewage. Cesspools and septic tanks are often prolific breeding places for them if not properly constructed or cared for, as are also barrels containing manure water for use in watering plants. These mosquitoes also breed in water retained in eaves troughs, on flat roofs, in street catch basins and gutters, and in ornamental pools.

The yellow-fever mosquito prefers relatively clear water and seldom, if ever, breeds in natural ponds or pools. Its wigglers are found in tanks or cisterns, and in cans, bottles, pots, jars, and other vessels that will hold even very small quantities of water. They often occur in unexpected places, such as discarded automobile casings, flower vases, holy-water and baptismal fonts, urns in cemeteries, water troughs, water pans for chickens, grindstone cans, dishes of water placed under legs of refrigerators, and unused toilet bowls or tanks.

Stages and Development

The black, oval eggs (fig. 3) of the yellow-fever mosquito are laid on the sides of water containers, usually above the water surface. If placed on the water at once, they hatch in about 2 days. If not

moistened, however, they may remain dormant for weeks or even months. When immersed in water they promptly hatch. Under most favorable conditions the wigglers (fig. 4) develop in 6 to 8 days and change into the less active tumbler or pupa stage (fig. 5), from which the adult insect (title page illustration and fig. 2) emerges about 2 days later. The complete development from egg to adult mosquito is, therefore, $9\frac{1}{2}$ to 12 days, or longer in cooler weather or under less favorable conditions.

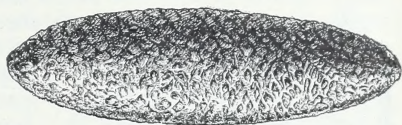


FIGURE 3.—Egg of the yellow-fever mosquito. About 100 times natural size.

The house mosquitoes have a similar developmental period, but they differ markedly from the yellow-fever mosquito in the egg stage. The eggs are laid in boat-shaped masses or rafts (fig. 6) directly on the surface of the water and, if dried, soon lose their ability to hatch.

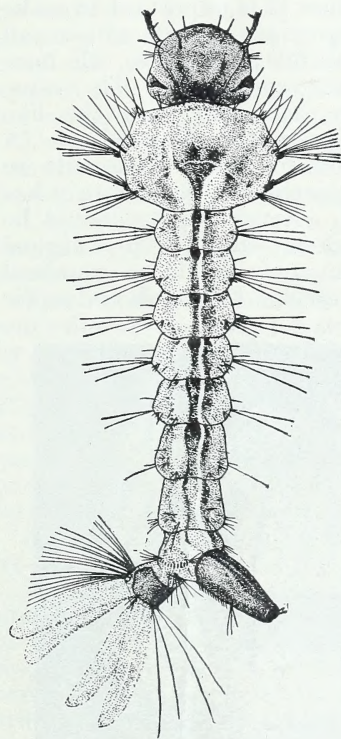


FIGURE 4.—Larva, or wiggler, of the yellow-fever mosquito. About 10 times natural size.

Biting Habits

Only the female mosquitoes bite. The males, which have poorly developed mouth parts, drink water and feed on the nectar from flowers.

The yellow-fever mosquito bites mainly during the daytime, especially late in the afternoon or early in the morning. In cloudy weather or in the darker portions of rooms it may bite throughout the day. The house mosquitoes are night biters and hide away in closets and other dark places during the day.

Flight Habits

The domestic mosquitoes are not long-distance fliers. When abundant about a house, they are usually to be found breeding in the vicinity. This is particularly true of the yellow-fever mosquito. The northern and southern house mosquitoes may travel a mile or so from the place where they breed. The yellow-fever mosquito seldom travels more than a few hundred yards. It is freely carried about, however, in trains and boats, and even in automobiles, airplanes, and dirigibles.

Overwintering

The northern and southern house, or rain-barrel, mosquitoes overwinter in the adult stage. Only the fertilized females survive. They hide away in protected places in out buildings, basements, unused rooms in houses, street drain traps, and storm sewers. They remain relatively inactive in cool places, but in warmer places breeding may con-

tinue throughout the winter. The yellow-fever mosquito is killed by cold weather in the northern part of its range; farther south it may overwinter in the egg stage or, under exceptionally favorable conditions in buildings, it may continue breeding during the winter. In the extreme southern portions of this country and in the Tropics it breeds the year around. In all parts of this country, however, breeding is greatly retarded in winter.

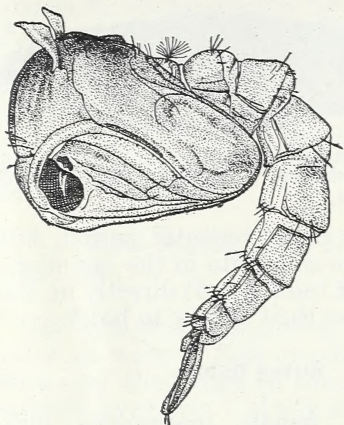


FIGURE 5.—Pupa, or tumbler, of the yellow-fever mosquito. About 10 times natural size.

How to Control Domestic Mosquitoes

Elimination of Breeding Places

Since domestic mosquitoes breed in so many places, it is important to make frequent inspections of the premises and eliminate, as far as possible, all temporary water containers. Tin cans, bottles, jars, old tires, and the like should be promptly disposed of. A good practice for every housewife to follow is to see that every tin can has holes punched in the bottom or has both ends removed and the can flattened. Eaves troughs should be examined occasionally to see that they are not stopped up or sagged so that they will hold water. Likewise flat roofs should be examined after rains to see that water is not held on them. Cesspools and septic

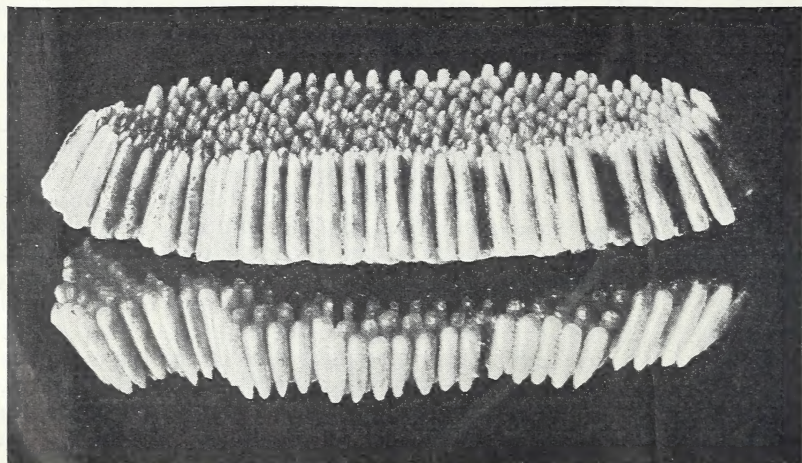


FIGURE 6.—Egg raft of the northern house mosquito as it floats on the water. About 60 times natural size.

tanks must be tightly covered, that is, so as to exclude all mosquitoes. Rain barrels or tubs in which water is stored are often the source of hordes of mosquitoes. Cisterns, whether above or below ground, often breed many of these pests. Open cisterns breed mosquitoes in

profusion. These should be tightly covered or screened, and the spouts must be screened also. Water troughs and pans used for chicken water should be emptied once a week and thoroughly washed.

Mosquitoes often breed in puddles of water allowed to drain under the house from refrigerators. Rain water, wash water, and water allowed to leak from hydrants and to form pools in the yard or in the street gutters are sources of mosquitoes. These pools can usually be eliminated by improved drainage.

Treatment of Breeding Places

Where breeding places cannot be abolished or screened, treatment of the water is necessary. For this purpose kerosene is most commonly used. A tablespoonful of kerosene thrown into a barrel or cistern containing water not used for drinking will destroy the wigglers in a few hours. This treatment has been used in cisterns from which water for culinary purposes is drawn from the bottom. It may also be employed in unused toilets and fire buckets, although in these places a small handful of powdered borax is better, as it does not evaporate or otherwise lose its strength, whereas kerosene must be applied every 2 or 3 weeks. Water treated with borax is satisfactory for washing dishes or clothing.

Drain traps in basements and areaways should be treated with kerosene every week or two, or, if borax is used, a new supply should be added each time the drains are flushed.

Cesspools should have a pint of equal parts of used motor oil and kerosene sprayed or sprinkled over the surface or introduced through a toilet every 3 or 4 weeks.

The breeding of domestic mosquitoes as well as malaria mosquitoes and other species that develop in ornamental pools may be controlled by stocking them with goodly numbers of goldfish or, better, with top minnows, if the fish are not fed and if vegetation in the pond is not allowed to become so dense as to prevent the fish from having full access to all parts of the water's surface. A light application of gasoline will destroy the wigglers then present without staining the pool or plants. Pyrethrum larvicide,¹ however, is somewhat more lasting and is less likely to injure the fish or vegetation.

Mosquito breeding in piles of old automobile tires can be prevented by an occasional application of paris green or borax with a dust gun.

The northern and southern house mosquitoes, as previously stated, breed in great numbers in sewage-polluted waters. The elimination or treatment of extensive breeding places of this kind becomes a responsibility of the community. Such contamination should be avoided as far as possible, as heavy pollution destroys the fish and other life in lakes or streams, and mosquito breeding can then go on at a tremendous rate. Furthermore, polluted waters are unsightly and otherwise undesirable or even dangerous to health. Weekly spraying of such breeding places with No. 2 fuel oil will control breeding until the pollution situation can be permanently met. Cleaning and straightening the banks of such polluted streams or lakes will aid in controlling mosquito breeding and also make thorough oiling easier.

Other responsibilities of the community are to prevent mosquito breeding in sewage filter beds and in water standing along poorly

¹Information on the manufacture and use of pyrethrum larvicide is given in Bureau of Entomology and Plant Quarantine mimeographed circular E-456, which will be furnished free on request.

graded streets and alleys and in public buildings and parks. Where well-organized county or city mosquito-control units exist, work of this kind is taken care of by them, and house-to-house inspection also may be carried out with good results. The educational features of such work should be emphasized and the responsibility for prevention of breeding placed largely on the occupant of the premises.

Screening and Bed Nets

In most communities the screening of houses is essential for protection against mosquitoes, flies, and other insects. The screens should be well fitted. They should be of 16-mesh wire cloth. A few of the small yellow-fever mosquitoes can get through standard 16-mesh wire. This can be avoided by painting the wire lightly with screen enamel, or 18-mesh wire may be used. Screens of bronze, copper, or one of the corrosion-resisting alloys are most durable in humid climates. In dry climates galvanized or painted wire is satisfactory. Full-length window screens are always more satisfactory than half screens or those inserted under the sash. Screen doors should open outward. Mosquitoes often enter houses through chimneys and open fireplaces, and screening these is frequently necessary. Bed nets, if kept mended and tucked under the mattress at the edges, give much protection in unscreened or poorly screened houses.

Sprays

When mosquitoes gain access to a house or other building a thorough treatment with an effective household spray is advised. Since these pests may live for weeks and repeatedly attack the inmates of a house, the importance of destroying them is evident. Dangerous malaria-carrying mosquitoes are also destroyed by sprays. An extract of pyrethrum in a highly refined kerosene oil is the material most used in such sprays. The material is applied with a good hand atomizer or with an electric sprayer. The rooms should be closed before being sprayed and kept closed 10 or 15 minutes. The air should be well filled with a fine-spray mist. Since these mosquitoes hide away behind pictures, under furniture, and among clothing in closets, all such hiding places should be reached by the spray. Sprays will also kill mosquitoes on screened porches, but here even more thorough application is necessary, and it is best to sweep up and destroy the paralyzed mosquitoes, as some may revive.

Repellents

There is no known substance that will give complete freedom from mosquito attack for more than a few hours. Oil of citronella is probably the most dependable. If oil of citronella is objectionable because of its odor, it can be mixed with spirits of camphor or oil of pennyroyal in equal proportions. Certain cut or growing plants have been reported to drive mosquitoes away, but none of these is of practical value.

